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at Polaris Bay, July 5, 1872. The Arachnida were represented by four species, two of which have been identified by Mr. J. H. Emerton. *Erigone psychrophila* Thorell occurred at Polaris Bay June 3, 1872, and there were two unnamed species from Polaris Bay. At Foulke Fiord *Lycosa glacialis* Thorell was collected. All the spiders have been sent to Dr. Thorell to report upon. Upon the body of a *Bombus Kirbyellus* occurred several specimens of a *Gamasus*.

Of fresh-water crustacea, besides a Copepod, *Daphnia rectispina* Kroyer occurred abundantly at Polaris Bay, August 1, 1872, as well as *Branchinecta groenlandica* Verrill.— A. S. PACKARD, JR.

MICROSCOPY.[1]

ILLUMINATION IN CONNECTION WITH POLARIZATION.—Mr. W. K. Bridgman, in a paper read before the Queckett Club, urges the importance of polarization as an element of microscopical illumination. His thoughtful and suggestive paper is very interesting, though far from conclusive in its demonstrations, and greatly marred by an apparent confusion in respect to the propagation, diffusion, and sensation of light. The essential point of his theory is that "it is the polarity induced by the impact of the ray, which excites or confers upon the reflected or refracted portion of the ray a condition enabling it to convey the impression of the object to the eye, and the desideratum is to restrict the effect as much as possible to this one action." It is not polarized light, but the act of polarization to which he attributes the effect. The excellence, for microscopical illumination, of light from a white cloud opposite the sun he attributes to its entire freedom from polarization, while the inferiority of light from a direction at right angles to this, or from the blue sky, is attributed to its being strongly polarized, a scattered polarization being said to afford the worst possible kind of illumination for the microscope. The author finds the best angle at which the light can be allowed to fall upon a painted surface to be its polarizing angle of about 56°, and to an approximate coincidence between the angle most conveniently obtained and the polarizing angle he ascribes the easy and general success in obtaining a good illumination of opaque objects by means of the side reflector or the condensing lens; though the result is at least equally well explained, in both cases, on the old theory that this is the angle at which an intense illumination is easily obtained without the view being obscured by a glare of reflected light. In the use of the Lieberkuhn, the author attributes the facility with which delicate details of structure are rendered visible by light from one edge,

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rather short and thick. Spring much longer than in *I. nivalis*, but shorter than in *I. tricolor*, not reaching to the insertion of the hind legs, while the fork is as long as the basal joint. It is black, and 0.06 inch in length. It differs from any American or North European species, and is certainly not the *Podura humicola* of Fabricius.

[1] Conducted by DR. R. H. WARD, Troy, N. Y.

though quite obliterated by a reflection from its whole surface, to the availability of light at the polarizing angle as compared with vertical rays; but in fact the instrument does not furnish a vertical illumination in any case, and when all light is stopped off except from its marginal portion an equally complete polarization is effected without, in common practice as well as in theory, the advantages attained by a unilateral illumination from one edge only of the reflector. In applying the same law to the use of transmitted light for transparent objects, it is advised to place the lamp in such a position that its rays shall fall upon the mirror at an angle of about 54½° in order that the reflected and refracted rays may be as perfectly separated as possible. To obtain the angle accurately in all these cases, it is advised to set the illuminating apparatus by the aid of a sector or a properly divided card. The employment of the silvered side reflector below the object, as a means of transparent or of dark ground illumination, is mentioned as giving a clear soft light and excellent definition at any desired angle of incidence, no claim being made that its use should be limited to any special angle; a judgment in which all who have been accustomed to use this little instrument as a substage accessory will be likely to cordially concur.

POLLEN TUBES FOR THE MICROSCOPE. — Mr. J. O'Brien's remarks on this subject, quoted from the *Garden* by the *Monthly Microscopical Journal*, represent that he always failed to succeed in obtaining pollen tubes by dissecting the fertilizing stigmas, though spending much time in the effort, and that he had always seen similar failure attend the labors of others. He therefore recommends that the tubes be obtained on a slide by means of the nectar which appears on the stigma at the time of fertilization. The centre of a common microscope slide is touched to the drop of nectar on the stigma, care having been taken to prevent previous pillage by insects, and the spot of nectar thus obtained on the slide is touched by a mature anther so as to leave a few pollen grains on it. In about half an hour a projection like a fleshy root may be seen to grow from the end of each pollen grain; and after an hour or two each tube will be long and snake-like, the grain still attached and representing the head. The rotation of the contents of the tube may now be observed, the fluid passing down one side of the tube and returning on the other side. Temperature and moisture should be carefully controlled, as the growth depends on the fluid condition of the nectar. When sufficiently developed the object may be immediately mounted by pressing down upon it a cover glass, the nectar soon hardening and forming a mounting material in which the pollen is well shown. Specimens prepared in this manner a year ago are still perfectly preserved. The author presumes that any plant which produces the nectar in sufficient quantity may be treated in this way, though he has succeeded best with bulbous plants, Lilium, Hymenocallis (Pancratium), Crinum, etc. It would be an interesting and useful field for investigation to determine what artificial preparation could be made to take the place of the natural nectar in these experiments, as a means of obtaining and mounting the pollen tubes of flowers.

San Francisco Microscopical Society. — This society, one of the most prosperous in the country, having outgrown its old quarters, has just moved to new rooms in the building known as the Thurlow Block, corner of Kearney and Sutter streets. The rooms, which were first occupied on occasion of the regular meeting of November 2d, are on the fourth floor, approached by means of an elevator, and consist of a handsomely furnished meeting-room supplied with book-cases and cabinet to contain the rapidly increasing collections of objects and books belonging to the society, and an adjoining room fitted up as a laboratory with abundant facilities for microscopical work.

SCIENTIFIC NEWS.

— Professor James Orton left home during the middle of October for South America, with the intention of exploring the Beni River in the interests of geographical science, natural history, and commerce.

— Under the title Entomologischer Kalender für Deutschland, Oesterreich und die Schweiz, Dr. F. Katter, of Putbus, Germany, has published a very useful pamphlet, containing a diary for 1876, a list of German, Austrian, and Swiss entomologists and entomological societies and journals.

— J. Munsell, Albany, announces for 1877 The Indian Miscellany; containing papers on the history, antiquities, arts, inventions, languages, religions, traditions, and superstitions of the American aborigines; with descriptions of their domestic life, manners, customs, traits, governments, wars, treaties, amusements, exploits, etc.; also sketches of travel and exploration in the Indian country, incidents of border warfare, journals of military expeditions, narratives of captivity, anecdotes of pioneer adventure, missionary relations, etc. Collected by W. W. Beach.

— The well-known London house of Macmillan & Co., publishers of *The Practitioner*, have undertaken the publication in England of Micro-Photographs in Histology, the monthly work conducted by Drs. Seiler, Hunt, and Richardson. A large edition is required by the English profession.

— F. A. Curtiss, of Jacksonville, Fla., can supply the ornamental Florida grasses and air plant (Tillandsia), so much prized for parlor decorations, sea-weeds, wood encrusted with barnacles or burrowed by the teredo, coquina rock, river shells, sea-fans, sea-willow, stag's horn and other corals, sea beans, and anything else in the line of Florida curiosities, including stuffed or live alligators, alligators' teeth and eggs, stuffed birds, etc.; also, views of Florida scenery. The first-mentioned will be *exchanged* for Algæ, curiosities, and articles of use to a naturalist.